



SPH4C

INTRO TO PHYSICS AND MOTION

PHYSICS DEFINED

Definition: The science of MATTER and ENERGY and their interaction.

- Based on measurement and mathematical processes.

MECHANICS

Mechanics is a branch in physics that deals with the study of **motion**. This consists of both ***Kinematics*** and ***Dynamics***.

Kinematics: The study of motion (*the act of moving through space, or changing position*) without reference to mass or force.

Dynamics: The study of motion of bodies while considering their masses and the responsible forces. Simply the study of why objects move the way they do.

Motion can be pictured in 2 ways:

a) With respect to a FRAME OF REFERENCE

- A subset of the physical world defined by an observer in which positions or motions can be discussed or compared.

b) At Rest

- The position of an object when it is allowed to hang freely and is not moving.



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MOTION AND MEASUREMENT

Motion is a concept that all of us are aware of without fully understanding it. At some point, we have all asked questions like:

How fast can you run?

How long does it take for that car to go from 0 to 60?

Do heavier objects fall faster?

All of these questions deal with the concept of motion. Quite simply, motion takes the concepts of distance, speed, and acceleration and relates them to time.

Measurement

It is quite important to measure correctly. The accuracy of your calculations can only be as accurate as your measurements. It is also extremely important to always include a unit with your measurements.

The certainty of your measurements is accurate to the number of **SIGNIFICANT DIGITS** your measurements include. The more significant digits, the more accurate your measurements and eventual answer will be.

All digits included in a stated value (except leading zeros) are significant digits.

Ex.

a) 307.0 cm

b) 0.03 m

c) 61 m/s

d) 0.5060 km



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CONVERTING UNITS

It is important to be able to convert units from one form to another in physics calculations. In some questions, the units given may not be the one you need to solve the problem.

Ex 1. Convert 2.6 km into meters (Note: 1 km = 1000 m)

Ex 2. An athlete completed a 5 km race in 19.5 min. Convert his time to hours.

Ex 3. A train is traveling at 95 km/h. Convert 95 km/h to m/s.



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HOMEWORK

- 7) Convert 27 months to fortnights (there are 14 days in a fortnight and ~30 days in a month)

- 8) Convert 0.09 miles to inches (there are 36 inches in a yard and 1760 yards in a mile)

- 9) Convert 4.66 centimeters to miles (there are 0.6 miles in a kilometer)

- 10) Convert 556 degrees Celsius to Kelvins

- 11) Convert 25 Kelvins to degrees Celsius